

PATENT CLAIMS

1. An active impact protection system for a knee area and/or lower leg area of a vehicle occupant in a motor vehicle, in particular a passenger vehicle, having an impact element (2) which is extensible by means of a driving device (4) out of a passive position into an active position in the direction of the vehicle occupants,  
characterized in that  
the impact element is formed by a lid (impact lid) (2) of a passenger-side glove compartment (3).
2. The impact protection system according to claim 1,  
characterized in that  
the driving device (4) is designed so that it moves the impact lid (2) essentially bidirectionally and/or one-dimensionally.
3. The impact protection system according to claim 1 or 2,  
characterized in that
  - the driving device (4) has a drive train (9) for moving the impact lid (2) which is designed so that it permits retraction of the impact lid (2) into its passive position in the event of a force (15) acting on the impact lid (2) from the outside in the direction of retraction,
  - the driving device (9) has at least one damper element (14) which is inserted into the drive train (9) and cooperates with the latter in such a way that it dampens a force acting on the impact lid (2) from the outside and driving the impact lid (2) into its passive position.

4. The impact protection system according to claim 3,  
characterized in that
  - the damper element (14) is activatable and deactivatable,
  - the damper element (14) is activated only when the impact lid (2) is extended, whereas it is deactivated during active retraction and extension.
5. The impact protection system according to any one of claims 1 through 4,  
characterized in that  
the driving device (4) extends the impact lid (2) during its activation until reaching a maximally extended end position or until a contact sensor or a control unit of the driving device (4) detects contact with an obstacle.
6. The impact protection system according to any one of claims 1 through 5,  
characterized in that  
to activate the impact lid (2) a pre-crash sensor is provided, whereby the driving device (4) retracts the impact lid (2) back into the passive position when the presumed crash fails to occur.
7. The impact protection system according to claim 6,  
characterized in that  
the rate of retraction for deactivation of the impact lid (2) is lower than the rate of extension for activation of the impact lid (2).
8. The impact protection system according to any one of claims 1 through 7,  
characterized in that

the impact lid (2) functions as a mobile impact protection system (1) which is also moved in the event of a crash until reaching its passive position, and then in its passive position it forms a stationary, energy-absorbing, deformable impact protection system (1).

9. The impact protection system according to any one of claims 1 through 8, characterized in that the glove compartment (3) has a dust container (7) which is adjustable by means of the driving device (4) together with the impact lid (2) between a retracted closed position in which the impact lid (2) is in its passive position and an extended open position in which the dust container (7) is accessible.

10. The impact protection system according to claim 9, characterized in that

- the driving device (4) moves the impact lid (2) together with the dust container (7) in operation of the glove compartment,
- the driving device (4) extends the impact lid (2) independently of the dust container (7) in order to activate the impact lid.

11. The impact protection system according to claim 9 or 10, characterized in that the rate of adjustment for opening and closing the dust compartment (7) is lower than the rate of extension in activation of the impact lid (2).

12. The impact protection system according to any one of claims 9 through 11,

characterized in that  
the dust container (7) is designed as a retractable  
and extensible drawer.

13. The impact protection system according to any one of  
claims 1 through 12,  
characterized in that  
the driving device (4) extends the impact lid (2) into  
a predetermined preventive position when the passenger  
has not engaged his seatbelt while the vehicle is  
being driven.

14. The impact protection system according to claim 13,  
characterized in that  
the driving device (4) stops the extension of the  
impact lid (2) into its preventive position when a  
contact sensor senses contact with an obstacle.

15. The impact protection system according to claim 13 or  
14,  
characterized in that  
the impact lid (2) exposes a view of a warning a  
warning to engage the seatbelt, said warning being  
visible to the passenger when the impact lid is moved  
into its preventive position.

16. The impact protection system according to any one of  
claims 13 through 15,  
characterized in that  
the driving device (4) automatically retracts the  
impact lid (2) into the passive position as soon as  
the passenger has engaged his seatbelt.

17. The impact protection system according to any one of  
claims 13 through 16,  
characterized in that

the rate of adjustment for adjusting the impact lid (2) into its preventive position and back is lower than the rate of extension in activation of the impact lid (2).

18. The impact protection system according to any one of claims 1 through 17, characterized in that a clamping sensor stops the retraction movement of the impact lid (2) when it senses contact between the impact lid (2) and an obstacle.